



Checklist of the mammals (Mammalia) of Colombia: Taxonomic changes in a highly diverse country

Héctor E. Ramírez-Chaves^{1*} , Darwin M. Morales-Martínez² , Miguel E. Rodríguez-Posada³ , Andrés Felipe Suárez-Castro⁴ 

1 Departamento de Ciencias Biológicas, Facultad de Ciencias Exactas y Naturales, and Centro de Museos, Museo de Historia Natural, Universidad de Caldas, Calle 65 # 26-10, and Carrera 23 # 57ª-83, Sede Palogrande, Manizales, Caldas, Colombia.

2 Grupo de Fauna, Programa de Ecosistemas y Recursos Naturales, Instituto Amazónico de Investigaciones Científicas SINCHI, Avenida Vásquez Cobo entre calles 15 y 16 Leticia, Colombia.

3 Grupo de Investigaciones territoriales para el uso y conservación de la biodiversidad, Fundación Reserva Natural La Palmita, Centro de Investigación. Carrera 4 # 58-59 oficina 201, Bogotá, Colombia

4 Instituto de Investigación de Recursos Biológicos Alexander von Humboldt, Avenida Paseo Bolívar 16-20 Bogotá, D.C, Colombia* Correspondencia: hector.ramirez@ucaldas.edu.co

Resumen

La actualización de la lista de especies presentes en un país es una tarea continua que llena vacíos de información y apoya la toma de decisiones. En los últimos cinco años, ha habido un aumento del número de especies de mamíferos descritas como nuevas en Colombia, así como primeros registros y cambios taxonómicos. Con el fin de actualizar la información de las especies de mamíferos de Colombia, realizamos una revisión exhaustiva de los cambios taxonómicos de las 528 especies registradas en listas previas. Agregamos nuevas especies descritas, así como nuevos registros de especies ya descritas. Discutimos especies cuya presencia ha sido sugerida recientemente en Colombia, pero que no es respaldada por especímenes de museo. La lista actual de mamíferos en Colombia tiene 543 especies, con cuatro descritas en el último año. Esperamos que la lista sea una herramienta apoyar las necesidades de investigación, en especial las extensiones de distribución, los problemas taxonómicos y la conservación de los mamíferos del país. Finalmente, recomendamos que las actualizaciones de la lista sigan estándares nacionales e internacionales como Darwin Core, utilizado por el Repositorio de Información Global sobre Biodiversidad - GBIF, y el Sistema de Información sobre Biodiversidad de Colombia - SiB.

Palabras clave: Darwin Core, Lista de especies, Mammalia, Taxonomía.

Abstract

Updating the list of species present in a country is a continuous task that fills information gaps and supports decision-making. In the last five years, there has been an increase in the number of mammal species described as new to Colombia, as well as first records and taxonomic changes. To update the information on the mammal species of Colombia, we carried out an exhaustive review of the taxonomic changes of the 528 species registered in previous lists. We add newly described species, as well as new records of already described species. We discuss species whose presence has recently been suggested in Colombia, but which are not supported by museum specimens. The current list (2021) of mammals in Colombia has 543 species, with four described in the last year. We hope that the list will be a tool to support research needs, especially distribution extensions, taxonomic problems and the conservation of mammals in the country. Finally, we recommend that updates to the list follow national and international standards such as Darwin Core, used by the

Key words: Check List, Darwin Core, Mammalia, Taxonomy.

The knowledge of the diversity of extant mammals of Colombia has increased substantially during the last decades. Since the last 20 years, almost 100 species have been added to the mammalian checklist of the country (Alberico et al. 2000, Solari et al. 2013, Ramírez-Chaves et al. 2016). This increment is due, among other multiple factors, to the collection and review of museum vouchers that are helping to clarify systematic problems and the association of different species with the ecological and environmental complexity of Colombia (Etter 1993). The Colombian Society of Mammalogy (Sociedad Colombiana de Mastozoología – SCMas) compiled the most recent checklist which accounted 528 mammal species (Ramírez-Chaves et al. 2019) and made it available through online platforms such as the Global Biodiversity Information Facility (GBIF; <http://www.gbif.org/>), and the Sistema de Información sobre Biodiversidad de Colombia (SiB). Since then, at least four new species of mammals with a type locality in Colombia have been described (Arenas-Viveros et al. 2021, Colmenares-Pinzón 2021, Morales-Martínez et al. 2021a, Rodríguez-Posada et al. 2021), several first records of mammal species in the country (e.g., González et al. 2020, Lozano-Flórez & Cifuentes-Acevedo 2020; Morales-Martínez et al. 2021b), new taxonomic arrangements excluding some species from Colombia (e.g., Rodríguez-Posada et al. 2021, Ramírez-Chaves et al. 2021a), and new proposals of binomen combinations have appeared (e.g., de Abreu et al. 2020). The articulation of the Colombian mammals' checklist to online repositories might contribute to updating the information in relatively short periods. This is particularly important in a country like Colombia which displays large gaps in mammals' biodiversity information (Morales-Martínez 2021, Suárez-Castro et al. 2021). This strategy was first suggested for mammals of Colombia by Ramírez-Chaves et al. (2016), has been adopted for other vertebrate groups of Colombia like freshwater fishes (DoNascimento et al. 2017), and might be a useful tool for evidence-based decision making. Here, we summarize the main changes to the checklist of mammals of Colombia following the Darwin Core standards implemented by the SiB Colombia. This standard allows regular updates of the biodiversity records for the country.

Addition, deletions, and taxonomic changes

The current list of mammals of Colombia is constituted by 13 orders (including Cetacea as a Parvorder within Artiodactyla), 50 families (excluding Aotidae but adding Chlamyphoridae for *Cabassous* and *Priodontes* [Gibb et al. 2016] and changing Megalonychidae to Choloepidae [Delsuc et al. 2019]), 213 genera, and 543 species. There are four additional species mentioned in the literature as new but not formerly described (Voss et al. 2009, Solari et al. 2013, Tribe 2015). These species would increase the number of mammals of the country to 547, however, we have decided to omit them until a formal description exists.

There are several changes regarding previous lists (e.g., Solari et al. 2013, Ramírez-Chaves et al. 2016, 2019). At the order level, Eulipotyphla was included instead of Soricomorpha following Burgin et al. (2020). At the family level, Aotidae is now included in Cebidae (Schneider and Sampaio 2015, Dumas and Mazzoleni 2017, but see Mammal Diversity Database 2021). At the genus level, the genus *Micoureus* was included as a subgenus in

Marmosa (Voss et al. 2014, 2020), and *Demanura* as a subgenus of *Artibeus* (Baker et al. 2016), whereas *Syntheosciurus granatensis* replaces “*Notosciurus*” *granatensis*, and *Leptosciurus* now includes “*Notosciurus*” *pucheranii*, and “*Microsciurus*” *isthmus*, “*M.*” *mimulus*, “*M.*” *otinus*, and “*M.*” *similis* (de Abreu et al. 2020). In total, 29 binomens were removed from the list as their current distributional ranges do not include Colombia, they are junior synonyms, or lack of vouchers that support their presence in the country (Table 2). Of these, 10 species were excluded of the list due to taxonomic changes (e.g., *Platyrrhinus nigellus* is currently a junior synonym of *P. umbratus*; Velazco et al. 2018) or because new reviews have shown that the distributional range does not include Colombia (e.g., *Marmosops fuscatus* and *M. parvidens*; Díaz-Nieto and Voss 2016). In contrast, 42 binomens were added to the list due to range extensions, taxonomic changes, or description of new species (Table 3). The new binomens (Table 3) include 16 bats (Chiroptera), eight rodents (Rodentia), seven marsupials (Didelphimorphia), four rabbits (Lagomorpha), two anteaters (Pilosa) two carnivores (Carnivora), one primate (Primates), one armadillo (Cingulata), and one shrew (Eulipotyphla).

TABLE 1. A summary of the taxonomic representation and endemic species of mammals of Colombia

Order	Families	Genera	Species	Endemics
Didelphimorphia ^a	1	12	39	2
Paucituberculata	1	1	2	0
Cingulata	2	3	6	0
Pilosa	4	5	8	0
Sirenia	1	1	2	0
Eulipotyphla	1	1	8	5
Chiroptera ^b	9	67	217	9
Carnivora ^c	8	24	35	0
Perissodactyla	1	1	3	0
Artiodactyla	7	24	42	0
Primates	4	15	38	10
Rodentia	10	58	137	34
Lagomorpha	1	1	6	5
Total	50	213	543	65

- One endemic but undescribed species of *Gracilinanus* (see Voss et al. 2009), and one of *Monodelphis* (see Solari et al. 2013) are not included.
- One undescribed species of *Carollia* listed by Solari et al. (2013) is not included.
- Neomachus tropicalis* is not included because is currently considered extinct (Rodríguez-Mahecha et al. 2006).

The 2021 checklist can be downloaded as an excel file in the [Supplementary Files section of this note](#).

The full checklist and previous versions can be downloaded in Darwin Core format at the following link: https://ipt.biodiversidad.co/sib/resource?r=mamiferos_col

TABLE 2. Mammal taxa excluded or modified in the checklist of mammals of Colombia.

Taxon	Action	Reference	Comments
Didelphimorphia			
<i>Micoureus</i>	Included in <i>Marmosa</i>	Voss et al. 2014, 2020	
<i>Marmosa demerarae</i>	Excluded	Voss et al. 2020	There are not confirmed records for Colombia
<i>Marmosa regina</i>	Excluded	Giarla and Voss (2020)	Junior synonym of <i>Marmosa isthmica</i>
<i>Marmosops fuscatus</i>	Excluded	Díaz-Nieto and Voss 2016	There are not confirmed records for Colombia
<i>Marmosops parvidens</i>	Excluded	Díaz-Nieto and Voss 2016	There are not confirmed records for Colombia
<i>Metachirus nudicaudatus</i>	Excluded	Voss et al. (2019)	The species present in Colombia is <i>M. myosuros</i>
<i>Philander opossum</i>	Excluded	Voss et al. (2018)	Previous records in Colombia belong to <i>P. melanurus</i>
<i>Philander mondolfii</i>	Excluded	Voss et al. (2018)	Junior synonym of <i>P. canus</i>
Cingulata			
<i>Dasyus kappleri</i>	Excluded	Feijó & Cordeiro-Estrela (2016)	The species present in Colombia is <i>D. pastasae</i>
Pilosa			
<i>Cyclopes didactylus</i>	Excluded	Miranda et al. (2018)	There are not confirmed records for Colombia. The taxa in Colombia are <i>C. ida</i> and <i>C. dorsalis</i>
Eulipotyphla			
Soricomorpha	Updated to Eulipotyphla	Burgin et al. (2018)	
Chiroptera			
<i>Dermanura</i>	Included in <i>Artibeus</i>	Baker et al. (2016)	
<i>Ametrida centurio</i>	Excluded	This work	There are not confirmed records for Colombia
<i>Anoura carishina</i>	Excluded	Calderón-Acevedo et al. (2021)	Junior synonym of <i>A. latidens</i>
<i>Eptesicus diminutus</i>	Excluded	Ramírez-Chaves et al. (2021a)	Restricted to southern South America. Records from Colombia in the literature are considered a different species (<i>Eptesicus orinocensis</i>)
<i>Histiotus montanus</i>	Excluded	Rodríguez-Posada et al. (2021)	There are not confirmed records for Colombia. <i>Histiotus montanus colombiae</i> was ranked to species status
<i>Myotis nesopolus</i>	Excluded	Novaes et al. (2021)	There are not confirmed records for Colombia. <i>Myotis nesopolus larensis</i> was ranked to species status
<i>Platyrrhinus matapalensis</i>	Excluded	This work	There are not confirmed records for Colombia
<i>Platyrrhinus nigellus</i>	Excluded	Velazco et al. (2018)	Junior synonym of <i>P. umbratus</i>
<i>Pteronotus parnelli</i>	Excluded	Pavan and Marroig 2016	There are not confirmed records for Colombia. <i>Pteronotus fuscus</i> and <i>P. rubiginosus</i> were ranked to species status.
<i>Tonatia saurophila</i>	Excluded	Basantes et al. (2020)	There are not confirmed records for Colombia. <i>Tonatia bakeri</i> and <i>T. maresi</i> were ranked to species status.
Carnivora			

<i>Mustela</i>	Excluded	Patterson et al. (2021)	Replaced by <i>Neogale</i> to include <i>N. felipei</i> and <i>N. frenata</i>
<i>Leopardus pajeros</i>	Excluded	Do Nascimento et al. (2021)	There are not confirmed records for Colombia. The species present in Colombia is <i>L. garleppi</i>
Primates			
Aotidae	Included as part of Cebidae	Schneider and Sampaio (2015)	
<i>Ateles geoffroyi</i>	Excluded	APC (2020)	There are not confirmed records for Colombia. Records in Colombia represent to <i>A. fusciceps</i>
<i>Cheracebus torquatus</i>	Excluded	Byrne et al. (2020)	There are not confirmed records for Colombia
<i>Saimiri macrodon</i>	Excluded	Lynch Alfaro et al. (2015)	Currently is considered a subspecies of <i>S. cassiquiarensis</i>
Artiodactyla			
<i>Pecari</i>	Changed to <i>Dicotyles</i>	Acosta et al. (2020)	Includes <i>Dicotyles tajacu</i>
Rodentia			
<i>Microsciurus</i>	Chaged to <i>Leptosciurus</i>	de Abreu et al. (2020)	
<i>Notosciurus</i>	Changed to <i>Leptosciurus</i> and <i>Syntheosciurus</i>	de Abreu et al. (2020)	
<i>Microsciurus similis</i>	Changed to <i>Leptosciurus similis</i>	de Abreu et al. (2020)	
<i>Notosciurus granatensis</i>	Changed to <i>Syntheosciurus granatensis</i>	de Abreu et al. (2020)	
<i>Notosciurus pucheranii</i>	Changed to <i>Leptosciurus pucheranii</i>	de Abreu et al. (2020)	
<i>Makalata didelphoides</i>	Excluded		There are not confirmed records for Colombia. Records of <i>M. didelphoides</i> from Colombia belong to <i>M. macrura</i>
<i>Proechimys poliopus</i>	Excluded	Patton et al. (2015)	Considered a junior synonym of <i>Proechimys guairae</i>
<i>Sylvilagus andinus</i>	Excluded	Ruedas et al. (2019)	There are not confirmed records for Colombia
<i>Sylvilagus brasiliensis</i>	Excluded	Ruedas et al. (2019)	There are not confirmed records for Colombia. Previous records belong to <i>S. apollinaris</i> , <i>S. fulvescens</i> , <i>S. nicefori</i> , or <i>S. salentus</i>

Taxonomic discussions

Several groups, especially small mammals (Didelphimorphia, Paucituberculata, Eulipotyphla, Chiroptera, and Rodentia), require updated systematic revisions. For example, within Rodentia, the specific epithet for marsh rats *Holochilus* that we adopt is *H. sciureus* based on the traditional use of that binomen. However, the presence of the species in the country is uncertain. Gonçalves et al. (2015) include no species of *Holochilus* in Colombia, but *H. sciureus* and *H. venezuelae* have been recorded in adjacent areas to the country. D'Elía et al. (2015) considered that Colombian *Holochilus* belongs to an undescribed species. Finally, Prado et al. (2021) consider that *H. venezuelae* is distributed in the Orinoco basin of Venezuela (adjacent to Colombian border), and *H. nanus*

corresponds to Amazonian populations. Under this scenario, the specific epithet or epithets for *Holochilus* populations are currently uncertain due to up to three species could be found in Colombia. Other rodent groups such as *Heteromys* are likely species complex and some taxa (e.g., *Heteromys anomalous herskovitzi*) need evaluation of their specific status (see Ramírez-Chaves et al. 2021b).

For bats, the validity of species such as *Sturnira mistratensis*, only known from the holotype (Ramírez-Chaves et al. 2020), has been questioned based on morphometric data (Torres et al. 2019). However, genetic information is needed to clarify whether this species is a valid species or a junior synonym of *S. parvidens* or another member of the *S. lilium* complex including the recently described *S. giannae*. In addition, the validity of the genus *Histiotus* has been questioned in recent work (e.g., Giménez et al. 2019). Neotropical *Eptesicus* and *Histiotus* thus require an integrative evaluation to clarify species boundaries and generic limits (Rodríguez-Posada et al. 2021). Even though some species such as *Ametrida centurio* are still considered part of the Colombian mammal diversity (Miller et al. 2016), we have excluded them since previous reports correspond to misidentifications (juvenile specimens of *Sphaeronycteris toxophyllum*). Finally, some species within the family Molossidae require revision, for example, *Cynomops abrasus* was included in Colombia by Alberico and Naranjo (1982), but recently Moras et al. (2016) criticized the validity of that records casting doubts on the presence of the species in the Country. Similarly, Moras et al. (2016) considered *Cynomops paranus* as a junior synonym of *Cynomops planirostris*. We decided to maintain the two names on the list until a review of the Colombian specimens is performed.

Taxonomic problems are also found in large and charismatic mammals such as deer in the genera *Mazama* and *Odocoileus*. Up to 11 cervid species have been included as part of the mammal list of the country (Solari et al. 2013), but recent compilations have reduced this number to six (Burgin et al. 2020) or seven species (Montenegro et al. 2019). In spite Montenegro et al. (2019) included records of *M. zamora* and *M. zetta* as *M. americana*, we have kept these two species in the list following Groves and Grubb (2011). In addition, *M. americana* has been recently restricted to Brazil and French Guiana (Cifuentes-Rincón et al. 2020).

Multiple strategies such as webpages updates or serial publications might be used to maintain an updated version of the checklist of mammals of Colombia. However, there are some steps that could be useful to reach this goal. First, we suggest the implementation of a curatorial team designated by the SCMas (the Mammal Taxonomy and Nomenclature group as part of the Natural History Collections Committee). This team will be in charge of reviewing and updating the list, as well as ensuring its periodic publication, depending on the number of changes accumulated. The SCMas can also follow examples such as the South American Classification Committee, which creates a standard classification for the bird species of South America (Remsen et al. 2021). We implemented the Darwin Core initiative standards (Wieczorek et al. 2019) in this list to follow the current national standards adopted by the SiB Colombia to make biodiversity information open and accessible. In addition, there is a need for developing a portal that can act as a central access point to data coming from multiple platforms such as GBIF and SiB Colombia. This portal could focus on reporting species that have not been recorded in particular regions, and it could follow established frameworks of biodiversity data integration (e.g., König et al. 2019). A big challenge consists on developing effective strategies for data mobilization and sharing. These strategies include the implementation of biodiversity digitization

workflows and protocols by natural collections, as well as the gathering of information from a growing number of citizen science projects that are not necessarily associated with public institutions. Accounting for the needs of multiple stakeholders will help to keep an updated list of mammal diversity of Colombia more efficiently.

TABLE 3. Additions to the checklist of mammals of Colombia. The department information includes mostly localities available in the references but distribution reviews are needed.

Binomen	Department	Reference
Didelphimorphia		
<i>Didelphis imperfecta</i>	Vichada	González et al. (2020)
<i>Philander canus</i>	Meta	Voss et al. (2018)
<i>Philander melanurus</i>	Antioquia, Caldas	Voss et al. (2018)
<i>Marmosa germana</i>	Caquetá	Voss & Giarla (2021)
<i>Marmosa jansae</i>	Putumayo	Voss & Giarla (2021)
<i>Marmosa meridae</i>	Cesar	Voss et al. (2020)
<i>Marmosa rutteri</i>	Amazonas, Caquetá	Voss et al. (2020)
Cingulata		
<i>Dasypus pastasae</i>	Meta, Putumayo	Feijó & Cordeiro-Estrela (2016)
Pilosa		
<i>Cyclopes dorsalis</i>	Antioquia, Magdalena, Nariño	Miranda et al. (2018)
<i>Cyclopes ida</i>	Amazonas, Caquetá, Meta	Miranda et al. (2018)
Eulipotyphla		
<i>Cryptotis niausa</i>	Nariño	Mejía-Fontecha et al. (2021)
Chiroptera		
<i>Gardnerycteris koepckeae</i>	Caquetá	Morales-Martínez et al. (2020)
<i>Gardnerycteris keenani</i>	Caldas, Córdoba, La Guajira, Magdalena, Santander, Valle del Cauca	Morales-Martínez et al. (2020)
<i>Tonatia bakeri</i>	Cesar, La Guajira	Basantes et al. (2020)
<i>Tonatia maresi</i>	Amazonas, Caquetá, Casanare, Huila, Meta, Putumayo, Vaupés	Basantes et al. (2020)
<i>Chiroderma gorgasi</i>	Antioquia, Valle del Cauca	Lim et al. (2020)
<i>Sturnira giannae</i>	Caquetá	Velazco & Patterson (2019)
<i>Vampyressa voragine</i>	Casanare	Morales-Martínez et al. (2021a)
<i>Pteronotus rubiginosus</i>	"Eastern Colombia"	Pavan & Marroig (2016)
<i>Pteronotus fuscus</i>	Bolívar, Magdalena, Sucre	Pavan & Marroig (2016)
<i>Thyroptera lavalii</i>	Amazonas	Morales-Martínez et al. (2021b)
<i>Cynomops kuizha</i>	Valle del Cauca	Arenas-Viveros et al. (2021)
<i>Cynomops tonkigui</i>	Norte de Santander	Moras et al. (2018)
<i>Eumops hansae</i>	Caldas	Torres & Rojas (2020)
<i>Eptesicus orinocensis</i>	Arauca, Meta	Ramírez-Chaves et al. (2021a)
<i>Histiotus cadenai</i>	Caldas, Quindío, Risaralda, Tolima, Valle del Cauca	Rodríguez-Posada et al. (2021)
<i>Histiotus colombiae</i>	Boyacá, Cundinamarca	Rodríguez-Posada et al. (2021)
<i>Myotis larensis</i>	La Guajira	Novaes et al. (2021)
Carnivora		
<i>Leopardus garleppi</i>	Nariño	Do Nascimento et al. (2021)
<i>Mirounga lionina</i>	Valle del Cauca	Ávila et al. (2021)
Primates		
<i>Ateles fusciceps</i>	Cauca, Chocó, Nariño, Risaralda, Valle del Cauca	APC (2020), Mammal Diversity Database (2021)
Rodentia		
<i>Anotomys leander</i>	Tolima	Marín & Sánchez-Giraldo (2017)

<i>Neacomys serranensis</i>	Santander	Colmenares-Pinzón (2021)
<i>Nectomys apicalis</i>	Caquetá, Meta	Chiquito (2015)
<i>Nectomys magdalenae</i>	Caldas, Cundinamarca	Chiquito (2015)
<i>Nephelomys nimbosus</i>	Huila	Bautista Plazas et al. (2018)
<i>Proechimys guairae</i>	Arauca, Norte de Santander	Patton et al. (2015)
<i>Makalata macrura</i>	Amazonas	Patton et al. (2015)
<i>Toromys rhipidurus</i>	Amazonas	Lozano-Flórez & Cifuentes-Acevedo (2020)
Lagomorpha		
<i>Silvilagus fulvescens</i>	Cauca	Ruedas et al. (2019)
<i>Sylvilagus apollinaris</i>	Cundinamarca	Ruedas et al. (2019)
<i>Sylvilagus nicefori</i>	Antioquia	Ruedas et al. (2019)
<i>Sylvilagus salentus</i>	Quindío	Ruedas et al. (2019)

ACKNOWLEDGMENTS

This paper is part of the Comité de Colecciones de la Sociedad Colombiana de Mastozoología. We thank the Sociedad Colombiana de Mastozoología (SCMas) for their support. AFSC is supported by a scholarship 848 from Minciencias.

REFERENCES

- ACP – Asociación Primatológica Colombiana. 2020. Lista de Primates Colombianos (2020). <https://www.asoprimatologicacolombiana.org/primates-de-colombia.html>
- Acosta LE, Garbino GS, Gasparini GM, Dutra RP. 2020. Unraveling the nomenclatural puzzle of the collared and white-lipped peccaries (Mammalia, Cetartiodactyla, Tayassuidae). *Zootaxa* 4851(1):60–80. <https://doi.org/10.11646/zootaxa.4851.1.2>
- Alberico M, Naranjo, LGH. 1982. Primer registro de *Molossops brachymeles* (Chiroptera: Molossidae) para Colombia. *Cespedesia* 11:141–143.
- Alberico M, Cadena A, Hernández-Camacho J, Muñoz-Saba Y. 2000. Mamíferos (Synapsida: Theria) de Colombia. *Biota Colombiana* 1(1):43–75.
- Arenas-Viveros D, Sánchez-Vendizú P, Giraldo A, Salazar-Bravo J. 2021. A new species of *Cynomops* (Chiroptera: Molossidae) from the northwestern slope of the Andes. *Mammalia* (ahead of print). <https://doi.org/10.1515/mammalia-2020-0068>
- Avila C, Trujillo GA, Alava JJ. 2021. Primeros registros de elefantes marinos en el Pacífico colombiano: ¿Elefantes marinos del sur, *Mirounga leonina*? *Caldasia* 43(2):408–411. <https://doi.org/10.15446/caldasia.v43n2.84687>
- Baker RJ, Solari S, Cirranello A, Simmons NB. 2016. Higher level classification of phyllostomid bats with a summary of DNA synapomorphies. *Acta Chiropterologica* 18(1):1–38. <https://doi.org/10.3161/15081109ACC2016.18.1.001>
- Basantes M, Tinoco N, Velazco PM, Hofmann MJ, Rodríguez-Posada ME, Camacho MA. 2020. Systematics and taxonomy of *Tonatia saurophila* Koopman & Williams, 1951 (Chiroptera, Phyllostomidae). *ZooKeys* 915: 59–86. <https://doi.org/10.3897/zookeys.915.46995>
- Bautista Plazas S, Rodríguez Bolaños A, Castellanos Flores R. 2018. First record of Eastern Cloud Forest Rat *Nephelomys nimbosus* (Rodentia: Cricetidae) for Colombia. *Therya* 9:103–106. <https://doi.org/10.12933/therya-18-431>

- Burgin CJ, Colella JP, Kahn PL, Upham NS. 2018. How many species of mammals are there? *Journal of Mammalogy* 99:1–11. <https://doi.org/10.1093/jmammal/gyx147>
- Burgin CJ, Wilson DE, Mittermeier RA, Rylands AB, Lacher TE, Secrest W. 2020. Illustrated checklist of mammals of the World. Volume 1: Monotremata to Rodentia. Barcelona: Lynx Edicions.
- Byrne H, Rylands AB, Nash SD, Boubli JP. 2020. On the taxonomic history and true identity of the collared titi, *Cheracebus torquatus* (Hoffmannsegg, 1807) (Platyrrhini, Callicebinae). *Primate Conservation* 34:13–52.
- Calderón-Acevedo CA, Rodríguez-Posada ME, Muchhala N. 2021 Morphology and genetics concur that *Anoura carishina* is a synonym of *Anoura latidens* (Chiroptera, Glossophaginae). *Mammalia* (ahead of print). <https://doi.org/10.1515/mammalia-2020-0183>
- Chiquito EDA. 2015. Sistemática do gênero *Nectomys* Peters, 1861 (Cricetidae: Sigmodontinae). Doctoral dissertation, Universidade de São Paulo, Brazil.
- Cifuentes-Rincón A, Morales-Donoso JA, Sandoval EDP, Tomazella IM, Mantellatto AMB, de Thoisy B, Duarte JMB. 2020. Designation of a neotype for *Mazama americana* (Artiodactyla, Cervidae) reveals a cryptic new complex of brocket deer species. *ZooKeys* 958:143–164. <https://doi.org/10.3897/zookeys.958.50300>
- Colmenares-Pinzón JE. 2021. Calling for a reassessment of rodent diversity in Colombia: description of a new species of *Neacomys* (Cricetidae: Oryzomyini) from the Magdalena Valley, with a new phylogenetic hypothesis for the genus and comments on its diversification. *Zootaxa* 4920(4):451–494. <https://doi.org/10.11646/zootaxa.4920.4.1>
- de Abreu-Jr. EF, Pavan SE, Tsuchiya MTN, Wilson DE, Percequillo AR, Maldonado JE. 2020. Museomics of tree squirrels: a dense taxon sampling of mitogenomes reveals hidden diversity, phenotypic convergence, and the need of a taxonomic overhaul. *BMC Evolutionary Biology* 20:77. <https://doi.org/10.1186/s12862-020-01639-y>
- D'Elía GD, Hanson JD, Mauldin MR, Teta P, Pardiñas UFJ. 2015. Molecular systematics of South American marsh rats of the genus *Holochilus* (Muroidea, Cricetidae, Sigmodontinae). *Journal of Mammalogy* 96:1081–1094. <https://doi.org/10.1093/jmammal/gyv115>
- Delsuc F, Kuch M, Gibb GC, Karpinski E, Hackenberger D, Szpak P, Martínez JG, Mead JI, McDonald HG, MacPhee RDE, Billet G, Hautier L, Poinar HN. 2019. Ancient mitogenomes reveal the evolutionary history and biogeography of sloths. *Current Biology* 29(12):2031–2042. <https://doi.org/10.1016/j.cub.2019.05.043>
- Díaz-Nieto JF, Voss RS. 2016. A revision of the didelphid marsupial genus *Marmosops*. Part 1, Species of the subgenus *Sciophanes*. *Bulletin of the American Museum of Natural History* 402:1–70.
- DoNascimento C, Herrera-Collazos EE, Herrera-R GA, Ortega-Lara A, Villa-Navarro FA, Usma-Oviedo JS, Maldonado-Ocampo JA. 2017. Checklist of the freshwater fishes of Colombia: a Darwin Core alternative to the updating problem. *ZooKeys* 708:25–138. <https://doi.org/10.3897/zookeys.708.13897>
- Do Nascimento FO, Cheng J, Feijó A. 2021. Taxonomic revision of the pampas cat *Leopardus colocola* complex (Carnivora: Felidae): an integrative approach. *Zoological Journal of the Linnean Society* 191(2): 575–611. <https://doi.org/10.1093/zoolinnean/zlaa043>
- Dumas F, Mazzoleni S. 2017. Neotropical primate evolution and phylogenetic reconstruction using chromosomal data. *The European Zoological Journal*, 84:1–18. <https://doi.org/10.1080/11250003.2016.1260655>
- Etter A. 1993. Diversidad ecosistémica en Colombia hoy. In: *Nuestra diversidad biológica*. CEREC-Fundación Alejandro Ángel - FAA, CERECFAA, Bogotá, Colombia. p. 43–61.

- Feijó A, Cordeiro-Estrela P. 2016. Taxonomic revision of the *Dasypus kappleri* complex, with revalidations of *Dasypus pastasae* (Thomas, 1901) and *Dasypus beniensis* Lönnberg, 1942 (Cingulata, Dasypodidae). *Zootaxa* 4170(2):271–297. <http://doi.org/10.11646/zootaxa.4170.2.3>
- Giarla TC, Voss RS 2020. On the Identity of Victoria's Mouse Opossum, *Marmosa regina* Thomas, 1898. *American Museum Novitates* 2020:1–13. <https://doi.org/10.1206/3960.1>
- Gibb GC, Condamine FL, Kuch M, Enk J, Moraes-Barros N, Superina M, Poinar HN, Delsuc F. 2016. Shotgun mitogenomics provides a reference phylogenetic framework and timescale for living xenarthrans. *Molecular Biology and Evolution* 33(3):621–642. <https://doi.org/10.1093/molbev/msv250>
- Giménez AL, Giannini NP, Almeida FC. 2019. Mitochondrial genetic differentiation and phylogenetic relationships of three *Eptesicus* (*Histiotus*) species in a contact zone in Patagonia. *Mastozoología Neotropical* 26(2):349–358.
- González TM, Moreno-Niño N, Molina E, Armenteras D. 2020. First confirmed record of the Guianan White-eared Opossum, *Didelphis imperfecta* Mondolfi & Pérez-Hernández, 1984 (Didelphimorphia, Didelphidae), from Colombia. *Check List* 16 (5): 1119–1123. <https://doi.org/10.15560/16.5.1119>
- González-Ruiz N, Ramírez-Pulido J, Arroyo-Cabrales J. 2011. A new species of mastiff bat (Chiroptera: Molossidae: *Molossus*) from Mexico. *Mammalian Biology* 76:461–469. <https://doi.org/10.1016/j.mambio.2010.06.004>
- Gonçalves PR, Teta P, Bonvicino CR. 2015. Genus *Holochilus*. In: Patton JL, Pardiñas UFJ, D'Elia G, editors. *Mammals of South America, Volume 2: Rodents*. University of Chicago Press, Chicago. p. 325–335.
- Groves PC, Grubb P. 2011. *Ungulate Taxonomy*. Johns Hopkins University Press, Baltimore, USA, 309 pp.
- König C, Weigelt P, Schrader J, Taylor A, Kattge J, Kreft H. 2019. Biodiversity data integration—the significance of data resolution and domain. *PLOS Biology* 17(3):e3000183. <https://doi.org/10.1371/journal.pbio.3000183>
- Lim BK, Loureiro LO, Garbino GST. 2020. Cryptic diversity and range extension in the big-eyed bat genus *Chiroderma* (Chiroptera, Phyllostomidae). *ZooKeys* 918:41–63. <https://doi.org/10.3897/zookeys.918.48786>
- Lozano-Flórez J, Cifuentes-Acevedo S. 2020. First records of Peruvian Toro, *Toromys rhipidurus* Thomas, 1928 (Rodentia, Echimyidae), in Colombia. *Check List* 16 (5):1337–1341. <https://doi.org/10.15560/16.5.1337>
- Lynch Alfaro JW, Boubli JP, Paim FP, Ribas CC, da Silva MNF, Messias MR, Röhe F, Mercês MP, Silva Júnior JS, Silva CR, Pinho GM, Koshkarian G, Nguyen MTT, Harada ML, Rabelo RM, Queiroz HL, Alfaro ME, Farias IP. 2015. Biogeography of squirrel monkeys (genus *Saimiri*): South-central Amazon origin and rapid pan-Amazonian diversification of a lowland primate. *Molecular Phylogenetics and Evolution* 82(Part B):436–454. <https://doi.org/10.1016/j.ympev.2014.09.004>
- Mammal Diversity Database. 2021. *Mammal Diversity Database* (Version 1.5). Zenodo. <https://doi.org/10.5281/zenodo.4139818>
- Marín-C, D, Sánchez-Giraldo C. 2017. Far away from the endemism area: first record of the Ecuador fish-eating rat *Anotomys leander* (Cricetidae: Sigmodontinae) in the Colombian Andes. *Mammalia* 81(6):627–633. <https://doi.org/10.1515/mammalia-2016-0100>
- Mejía-Fontecha IY, Pérez Tapie KD, Velásquez-Guarín D, Ossa-López PA, Rivera-Páez FA, Ramírez-Chaves HE. 2021. First record of the Northern Ecuadorian Shrew, *Cryptotis niausa* Moreno

- Cárdenas & Albuja, 2014 (Eulipotyphla, Soricidae), in Colombia. Check List 17 (5):1345–1352. <https://doi.org/10.15560/17.5.1>
- Miller B, Reid F, Arroyo-Cabral J, Cuarón AD, de Grammont PC. 2016. *Ametrida centurio* (errata version published in 2017). The IUCN Red List of Threatened Species 2016: e.T1137A115055683. <https://doi.org/10.2305/IUCN.UK.2016-3.RLTS.T1137A22070667.en> Downloaded on 2021-05-18.
- Miranda FR, Casali DM, Perini FA, Machado FA, Santos FR. 2018. Taxonomic review of the genus *Cyclopes* Gray, 1821 (Xenarthra: Pilosa), with the revalidation and description of new species, Zoological Journal of the Linnean Society 183(3):687–721. <https://doi.org/10.1093/zoolinnean/zlx079>
- Montenegro OL, López-Arévalo HF, Mora-Beltrán C, Lizcano DJ, Serrano H, Mesa E, Bonilla-Sánchez A. 2019. Chapter 9 Tropical Ungulates of Colombia. In: Gallina-Tessaro S, editor. Ecology and Conservation of Tropical Ungulates in Latin America. Springer Nature, Cham, Switzerland. p. 157–194.
- Moras LM, Tavares V, Pepato AR, Santos FR, Gregorin R. 2015. Reassessment of the evolutionary relationships within the dog-faced bats, genus *Cynomops* (Chiroptera: Molossidae). Zoologica Scripta 45(5):465–480. <https://doi.org/10.1111/zsc.12169>
- Morales-Martínez DM. 2021. Mamíferos (Mammalia) de la Amazonía colombiana. Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales. 45(175):474–488. <https://doi.org/10.18257/raccefyn.1318>
- Morales-Martínez DM, Ramírez-Chaves HE, Colmenares-Pinzón JE, Gómez LG. 2020. The Koepcke's Spear-nosed bat *Gardnerycteris koepckeae* (Chiroptera: Phyllostomidae) is not endemic to Peru: First record from the Amazon foothills of Colombia. Mammalia 84(5):439–447. <https://doi.org/10.1515/mammalia-2019-0107>
- Morales-Martínez DM, Rodríguez-Posada ME, Ramírez-Chaves HE. 2021a. A new cryptic species of the yellow-eared bat *Vampyressa melissa* species complex (Chiroptera: Phyllostomidae) from Colombia. Journal of Mammalogy 102(1):90–100. <https://doi.org/10.1093/jmammal/gyaa137>
- Morales-Martínez DM, Rodríguez-Posada ME, Acosta-Morales SG, Saldarriaga-Gómez AM. 2021b. First confirmed record of the LaVal's Disk-winged Bat, *Thyroptera lavalii* Pine, 1993 (Chiroptera, Thyropteridae), from Colombia. Check List 17(2):471–478. <https://doi.org/10.15560/17.2.471>
- Moras L, Gregorin R, Sattler T, Tavares V. 2016. Uncovering the diversity of dog-faced bats from the genus *Cynomops* (Chiroptera: Molossidae), with the redescription of *C. milleri* and the description of two new species. Mammalian Biology 89:37–51. <https://doi.org/10.1016/j.mambio.2017.12.005>
- Novaes RLM, Cláudio VC, Larsen RJ, Wilson DE, Weksler M, Moratelli R. 2021. The taxonomic status of *Myotis nesopolus larensis* (Chiroptera, Vespertilionidae) and new insights on the diversity of Caribbean *Myotis*. ZooKeys 1015:145–167. <https://doi.org/10.3897/zookeys.1015.59248>
- Patterson BD, Ramírez-Chaves HE, Vilela JF, Soares AER, Grewe F. 201. On the nomenclature of the American clade of weasels (Carnivora: Mustelidae). Journal of Animal Diversity 3(2):1–8. <https://doi.org/10.29252/JAD.2021.3.2.1>
- Patton JL, Pardiñas UFJ, D'Elia G, editors. 2015. Mammals of South America, Volume 2: Rodents. The University of Chicago Press, USA.
- Pavan AC, Marroig G. 2016. Integrating multiple evidences in taxonomy: species diversity and phylogeny of mustached bats (Mormoopidae: *Pteronotus*). Molecular Phylogenetics and Evolution 103:184–198. <http://dx.doi.org/10.1016/j.ympev.2016.07.011>
- Prado JR do, Knowles LL, Percequillo AR. 2021. New species boundaries and the diversification history of marsh rat taxa clarify historical connections among ecologically and geographically

- distinct wetlands of South America. *Molecular Phylogenetics and Evolution* 155:106992. <https://doi.org/10.1016/j.ympev.2020.106992>.
- Ramírez-Chaves HE, Suárez-Castro AF, González-Maya JF. 2016. Cambios recientes a la lista de los mamíferos de Colombia, *Mammalogy Notes* 3:1–20.
- Ramírez-Chaves HE, Suárez Castro AF, Sociedad Colombiana De Mastozoología, Zurc D, Concha Osbahr DC, Trujillo A, Noguera Urbano EA, et al. 2019. Mamíferos de Colombia. Versión 1.4. Sociedad Colombiana de Mastozoología. Checklist dataset <https://doi.org/10.15472/kl1whs> accessed via GBIF.org on 2019-09-26. <https://doi.org/10.15472/kl1whs>
- Ramírez-Chaves HE, Noguera-Urbano EA, Morales-Martínez D, Zurc D, Vargas-Arboleda AF, Mantilla-Meluk H. 2020. Endemic bats (Mammalia: Chiroptera) of Colombia: State of knowledge, distribution, and conservation. *Universitas Scientiarum* 25(1):55-94. <https://doi.org/10.11144/Javeriana.SC25-1.ebmc>
- Ramírez-Chaves HE, Morales-Martínez DM, Pérez WA, Velásquez-Guarín D, Mejía-Fontecha IY, Ortiz-Giraldo M, Ossa-López PA, Rivera Páez FA. 2021a. A new species of small *Eptesicus Rafinesque* (Chiroptera: Vespertilionidae) from northern South America. *Zootaxa* 5020(3):489–520. <https://doi.org/10.11646/zootaxa.5020.3.4>
- Ramírez-Chaves HE, Velásquez-Guarín D, Ocampo-Velásquez JD, Mejía-Fontecha IY, Acosta AE, Colmenares-Pinzón JE, Castaño JH, Roncancio Duque N. 2021b. Mammals of the Natural National Park Selva de Florencia, Caldas, Colombia. *Therya* 12(2):461–475. <https://doi.org/10.12933/therya-21-1101>
- Remsen JV, Jr, Areta JI, Bonaccorso E, Claramunt S, Jaramillo A, Lane DF, Pacheco JF, Robbins MB, Stiles FG, Zimmer KJ. 2021. A classification of the bird species of South America. American Ornithological Society. <http://www.museum.lsu.edu/~Remsen/SACCBaseline.htm>
- Rodríguez-Mahecha JV, Alberico M, Trujillo F, Jorgenson J, editors. 2006. Libro Rojo de los Mamíferos de Colombia. Serie Libros Rojos de Especies Amenazadas de Colombia. Conservación Internacional Colombia y Ministerio de Medio Ambiente, Vivienda y Desarrollo Territorial, Bogotá, D.C., Colombia.
- Rodríguez-Posada MP, Morales-Martínez DM, Ramírez-Chaves HE, Martínez-Medina D, Calderón-Acevedo CA. 2021. A new species of Long-eared Brown Bat of the genus *Histiotus* (Chiroptera) and the revalidation of *Histiotus colombiae*. *Caldasia* 43(2):221–234. <https://doi.org/10.15446/caldasia.v43n2.85424>
- Ruedas LA, Silva SM, French JH, Platt RN, Salazar-Bravo J, Mora JM, Thompson CW. 2019. Taxonomy of the *Sylvilagus brasiliensis* complex in Central and South America (Lagomorpha: Leporidae). *Journal of Mammalogy* 100(5):1599–1630. <https://doi.org/10.1093/jmammal/gyz126>
- Schneider H, Sampaio I. 2015. The systematics and evolution of New World primates - A review. *Molecular Phylogenetics and Evolution* 82 Pt B: 348–357. <https://doi.org/10.1016/j.ympev.2013.10.017>
- Solari S, Muñoz-Saba Y, Rodríguez-Mahecha J, Defler TR, Ramírez-Chaves HE, Trujillo F. 2013. Riqueza, Endemismo y conservación de los mamíferos de Colombia. *Mastozoología Neotropical* 20:301–365.
- Suárez-Castro AF, Ramírez-Chaves HE, Noguera-Urbano EA, Velásquez-Tibatá J, González-Maya JF, Lizcano DJ. 2021. Vacíos de información espacial sobre la riqueza de mamíferos terrestres continentales de Colombia. *Caldasia* 43(2):247–260. <https://doi.org/10.15446/caldasia.v43n2.85443>
- Tribe CJ. 2015. Genus *Rhipidomys* Tschudi, 1845. In: Patton JL, Pardiñas UFJ, D'Elia G, editors. *Mammals of South America, Volume 2: Rodents*. The University of Chicago Press, USA. p. 583–617.

- Torres DA, Montoya-Marín M, Ibagón N, Castaño JH. 2019. ¿Es el murciélago endémico *Sturnira mistratensis* una especie? Evidencia desde la morfometría geométrica. In: Asociación Colombiana de Zoología. Reconciliarte con la biodiversidad, un acto de paz. Libro de resúmenes. V Congreso Colombiano de Zoología. Asociación Colombiana de Zoología. p. 433.
- Torres D, Rojas AE. 2020. First record of Sanborn's bonneted bat, *Eumops hansae* (Molossidae), in Colombia. *Mammalia* 84(6):595–599. <https://doi.org/10.1515/mammalia-2019-0140>
- Velazco PM, Patterson BD. 2019. Small mammals of the Mayo River Basin in northern Peru, with the description of a new species of *Sturnira* (Chiroptera: Phyllostomidae). *Bulletin of the American Museum of Natural History* 429:1-6
- Velazco PM, Guevara L, Molinari J. 2018. Systematics of the broad-nosed bats, *Platyrrhinus umbratus* (Lyon, 1902) and *P. nigellus* (Gardner and Carter, 1972) (Chiroptera: Phyllostomidae), based on genetic, morphometric, and ecological niche analyses. *Neotropical Biodiversity* 4:118–132. <https://doi.org/10.1080/23766808.2018.1494481>
- Voss RS, Fleck DW, Jansa SA. 2009. On the diagnostic characters, ecogeographic distribution, and phylogenetic relationships of *Gracilinanus emiliae* (Didelphimorphia: Didelphidae: Thylamyini). *Mastozoología Neotropical* 16:433–443.
- Voss RS, Gutiérrez EE, Solari S, Rossi RV, Jansa SA. 2014. Phylogenetic relationships of mouse opossums (Didelphidae, *Marmosa*) with a revised subgeneric classification and notes on sympatric diversity. *American Museum Novitates* 3817:1–27.
- Voss RS, Díaz-Nieto JF, Jansa SA. 2018. A revision of *Philander* (Marsupialia: Didelphidae), part 1: *P. quica*, *P. canus*, and a new species from Amazonia. *American Museum Novitates* 3891:1–70.
- Voss RS, Fleck DW, Jansa SA. 2019. Mammalian diversity and Matses ethnomammalogy in Amazonian Peru Part 3: Marsupials (Didelphimorphia). *Bulletin of The American Museum of Natural History* 432:1–87.
- Voss RS, Giarla TC, Díaz-Nieto JF, Jansa SA. 2020. A Revision of the didelphid marsupial genus *Marmosa* Part 2. Species of the *rapposa* group (subgenus *Micoureus*). *Bulletin of the American Museum of Natural History* 439:3–60. <https://doi.org/10.1206/0003-0090.439.1.1>
- Voss RS, Giarla TC. 2021. A revision of the didelphid marsupial genus *Marmosa* part 3. A new species from western Amazonia, with redescription of *M. perplexa* Anthony, 1922, and *M. germana* Thomas, 1904. *American Museum Novitates* 3969:1–28. <https://doi.org/10.1206/3969.1>
- Wieczorek J, Bloom D, Guralnick R, Blum S, Döring M, Giovanni R, Robertson T, Vieglais D. 2012. Darwin Core: An Evolving Community-Developed Biodiversity Data Standard. *PLoS ONE* 7(1):e29715. <https://doi.org/10.1371/journal.pone.0029715>

Editor: Diego J. Lizcano

Received: 2021-05-30

Reviewed: 2020-06-15

Accepted: 2021-07-11

Published: 2022-12-15